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For: Arrangement for Holding a Camera Behind a Monocular or Binocular

Verification of Translation

I, the below named translator, hereby declare that: my name and post office address are as stated below; that I am knowledgeable in the English language and in the language of German patent application 102 44 669.5 and I believe the attached English translation to be a true and complete translation of this document.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine of imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

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Arrangement for Holding a Camera Behind a Monocular or Binocular

Description:

The invention relates to an arrangement for holding a camera behind binoculars.

A photo adapter offered by the Leica Company of Germany provides the possibility of connecting a miniature camera to a monocular. The monocular performs the task of a super telephoto lens for the camera. The adapter includes a complex seven lens optic. A T2 adapter with a corresponding bayonet is required in order to connect the camera to the photo adapter.

The Nikon Company of Japan also offers a camera adapter with which a camera is so connected to a monocular that photographs can be made with the camera. However, only Nikon cameras can be connected to the Nikon monocular by means of this adapter which means a limitation for the customer.

For a camera connected to the monocular, it is also disadvantageous that the user can only see the image made available by the monocular through the viewfinder of the camera. Once the camera is mounted to the monocular, several manipulations are required so that the user can again look through the monocular and therefore obtain a complete impression of the image.

Furthermore, a system is known from the Nikon Company, as also from the Vixen Company, wherein a CCD camera can be connected to a viewing monocular. A separate LCD monitor can be connected to the CCD camera by means of which the user can view the image recorded via the monocular. Furthermore, a video camera can be connected with a video cable.

German Patent 2,825,505 discloses connecting a binocular to a camera having a telephoto lens so that the viewing fields of the camera and the binocular with reference to angle orientation are coincident. A functional coupling between the binocular and the camera is not provided. The camera and the binocular are provided one next to the other so that the optic of the binocular and, in parallel, the optic of the camera each generate an image.

A combination of a camera and a binocular is known from United States Patent 4,445,766. The focal length of the telephoto lens of the camera is so selected that everything between 10 meters and infinity is imaged sharply.

United States Patent 2,933,026 discloses the combination of a binocular and a camera. Here, the focusing devices of camera and binocular are so mechanically coupled to each other that, with a sharp adjustment of the binocular, the camera is also correspondingly focused.

A binocular is disclosed in United States Patent 2,882,791 which is provided with an additional photo objective for recording images.

United States Patent 6,330,401 discloses holding a camera behind one ocular of a binocular. The free ocular is then used by the user for viewing the image obtained with the binocular. This is, however, very uncomfortable for the user and one must accept unsharp images of the camera because of the high magnification of the binocular.

The task of the invention was to provide an arrangement which is cost effective.

A further task of the invention was to provide an arrangement by means of which, independently of the camera used, a combination of a camera and a glass (binocular or monocular) is

possible.

A further aspect of the invention was to provide an arrangement by means of which the user is given the possibility of rapidly changing between the camera mounted rearward of the ocular of the glass (binocular or monocular) and to a position wherein the user can look through the glass. The possibility of the rapid change is especially interesting for monoculars. This task of the invention is solved by the independent claim 5.

The arrangement according to claim 1 includes a camera mount, a base and an attachment device. The base can be attached to a tripod attachment element, which is configured on the glass, by means of an attachment device and the camera is held by the camera mount. In this way, an arrangement is provided which is cost effective because of its simple configuration and can be utilized independently of the camera used.

Preferably, the camera is fixedly connected to the mount with the body of the camera.

In an advantageous embodiment, a tripod base attachment element is configured in the base so that the system comprising the arrangement of the invention, glass and camera can be mounted on a tripod.

It has been shown to be especially advantageous to provide the possibility to arrange the tripod in the region of the center of gravity of the system formed by the arrangement, camera and glass. In this way, it can be ensured that the system including the camera is provided by the tripod with an especially stable support not subjected to shaking.

With the measure of making available an arrangement having a base and a camera mount for holding the camera in a configuration rearward of the ocular of a glass, an arrangement is provided

wherein the camera can be pivoted away from the ocular of the glass. The base is fixed in position relative to the glass and a joint is arranged between the camera mount and the base. In this way, a rapid change can be completed between the camera, which is positioned forward of the ocular of the glass, and the ocular, which is cleared of the camera, for viewing by the user.

Once the camera is exactly positioned with reference to the ocular of the glass, then, without surrendering this base adjustment, a change is possible between the camera positioned optimally forward of the ocular of the glass and the ocular cleared of the camera, except for the angle position setting.

It has been shown to be advantageous to provide a rotational or ball joint as a joint. In a preferred embodiment, the rotational joint has at least one, preferably several detent positions. With a changeover between the detent positions and when there is a return pivoting into the original detent position, the angular position is again assumed automatically which is assigned to this detent position.

In advantageous embodiments, a length adjustment and/or an elevation adjustment and/or a lateral adjustment is provided so that the camera can be exactly positioned relative to the ocular. Furthermore, it is possible to adapt the arrangement with reference to the particular glass, especially a monocular, via the length adjustment and elevation adjustment.

In a preferred embodiment, the camera is provided with a joint connection which can be latched. A ball joint connection has proven to be especially suitable. With this latchable ball joint connection, it is possible to very exactly adjust the objective to the camera with reference to the ocular of the glass with respect to tilt and angle positions. With the latching of

the joint, this once adjusted position is retained.

With the alignment of the camera to the glass (monocular or binocular), it is possible to mount the ocular-end end surface of the objective of the camera and the objective-end end surface of the ocular of the glass parallel to each other. It is possible to adjust the objective of the camera exactly to the center of the ocular by means of the elevation adjustment and the lateral adjustment. The distance between the end surface of the ocular of the glass and the end surface of the objective of the camera are minimized by the length adjustment. Furthermore, with the length adjustment, the arrangement can be adapted to glasses having different length dimensions. Furthermore, the most different objective dimensions of camera objectives and various housing dimensions of camera housings are considered.

Further advantageous measures are described in further dependent claims. The invention will be described with reference to the following embodiments wherein:

FIG. 1 shows an arrangement for connecting a camera and a monocular wherein the monocular has a linear view; and,

FIG. 2 shows an arrangement for connecting a camera to a monocular wherein the monocular has an inclined view of less than 45°C.

The glass 3 shown in FIG. 1 is a monocular and includes an ocular 7, an objective 13 and a housing 15. Furthermore, the monocular 3 has a focus drive 17. A grasping region 21 having grasping recesses 23 is arranged in the lower region of the monocular 3. The grasping recesses are preferably made of a rubber-like material. Furthermore, the monocular 3 includes an attachment element 19 for a stand or tripod. It is understood that the arrangement of FIG. 1 could be used also with a glass in

form of a binocular.

The optics of the objective fix an optical axis 14 of the objective 13 and an optical axis 11 of the ocular 7 is fixed by the optical elements of the ocular 7. With the monocular 3 having linear viewing, the optical axes (11, 14) of the ocular 7 and objective 13 are coincident.

A base 39 is tightly connected to the attachment element 19 for a stand or tripod via an attachment device 43. In the embodiment shown, the base 39 is configured in the form of a base plate 41. The base 39 could, however, also have another shape, for example, it could be rod-shaped or angle-shaped.

In the embodiment shown, the connection between the base plate 41 and the attachment element 19 is provided by a clamp screw. However, a tight connection between the attachment element 19 and the base plate 41 could be provided especially by an element including clamping jaws. The attachment device 43 should be so configured that it can be again loosened so that the arrangement can be separated from the monocular 3. Attachment elements 19, as a rule, have a standardized form so that a tight connection can be provided between the attachment element 19 and the base 39. In most cases, this is done by means of a one-quarter inch clamp screw 45. A cutout (not shown) is provided in the base 39 so that the clamp screw 45 can pass through the base plate 41.

Several base attachment elements 47 for a stand or tripod are configured in the base plate 41. It can be especially provided that several threaded bores are configured in the base plate 41 so that this base plate 41 can be threadably fastened to a stand or tripod by means of a screw. The position at which the base plate is mounted on the stand can be so selected that it is

possible to connect the base plate 41 to the stand so that the vertical of the center of gravity of the system (comprising camera, monocular and the arrangement) passes in the vicinity of one of the base attachment elements 47, however, this vertical preferably passes directly through the particular base attachment element 47 selected.

Base plate 41 is connected to a member 54 by means of a joint 49. A rotational joint 51 is provided as joint 49 and has a rotational axis 53 perpendicular to the optical axis of the monocular 3. With this arrangement of the rotational axis 53, the camera can be pivoted laterally away from the ocular 7. If the rotational axis 53 of the rotational joint 51 were parallel to the optical axis 11 of the ocular, then the camera could likewise be pivoted away from the ocular but the region behind the boundary surface of the ocular would not be entirely cleared. The boundary surface is delimited by the end edges of the ocular. It is especially advantageous when the region (which is formed by the perpendicular from the last user-end end point of the ocular 7 of the monocular 3) is cleared by pivoting away the camera.

For this reason, it is especially advantageous when the rotational axis 53 of the rotational joint 51 and the optical axis 11 of the ocular 7 conjointly define an angle. Furthermore, it is advantageous when the rotational axis 53 is disposed between the base attachment element 47 and the boundary surface of the ocular 7 of the monocular 3. In this way, it is ensured that the region rearward of the ocular is completely or almost completely cleared when the camera is pivoted.

In the embodiment shown, a rotational joint 51 is used with which, when a camera is pivoted to the right and pivoted to the

left, there are three detent positions at a spacing of 45°C starting from the position assumed behind the ocular. With a pivoting to the left, the free space on the right side of the monocular is held completely free so that a right handed person can actuate the focus drive without hindrance.

In lieu of the rotational joint, a ball joint can be provided by means of which the camera can be pivoted away from the ocular of the monocular. It has been shown to be especially advantageous when the rotational point of the joint lies approximately on the optical axis 11 of the ocular 7.

The rotationally-movable element 54 is releasably connected to a counter element 57 to make available a length setting 55 via a clamp element 59. By loosening the clamp element 59, the counter element 57 can be displaced relative to the rotationally-movable element 54. An adjustment in length of this kind can be provided, for example, by providing a slot in the counter element 57 of the length adjustment. An axial guide can be provided so that the counter element 57 can be shifted only in the longitudinal direction relative to the element 54. For example, a U-shaped element can be provided as the rotationally-movable element 54. The counter element 57 is then guided by the two legs of the U-shaped element. In a configuration of this kind, the counter element 57 can be pressed against the base of the U-shaped element by means of a clamp element 59 whereby a fixed clamping can be achieved. Since the numerous clamp structures are known to the expert, a further enumeration is dispensed with.

If no axial guide is provided, then the joint can be omitted and the counter element 57 of the length adjustment can be pivoted to the side by loosening the clamp element 59. In an

embodiment of this kind, a separate rotationally-movable element 54 is unnecessary.

The arrangement of the rotational joint 51 and the counter element 57 of the length adjustment can, of course, be configured in the opposite sequence.

The counter element 57 is configured as an angle element. A slide 67 is releasably and fixably connected to the second leg by means of a clamp element 69. The second leg is not connected to the rotationally-movable element 54. In this type of clamp connection by means of clamp element 69, the same system can be used as in the clamp connection by means of the clamp element 59. With the slide 67, the camera, especially the objective 29 thereof, can be adjusted in elevation relative to the ocular 7 of the monocular 3.

The slide 67 includes a camera mount 31 in the form of a base plate 32. This base plate 32 is part of the slide 67 configured as angle element 37. In the embodiment shown, the thread, which is configured in most cameras in the base of the camera housing, is used in order to attach the camera housing 26 and therefore the camera 25 fixedly to the base plate 32 by means of a screw 35. If the camera 25 does not have a thread of this kind, then an attachment by means of clamping jaws can be provided on the slide 67.

In an advantageous embodiment (not shown), a ball head of a ball joint can be attached to the camera either by means of clamping or by a threaded fastener and the ball head is journalled in a ball socket. The ball socket is fixedly connected to the slide joint. This ball socket is provided with a latching mechanism which is preferably in the form of clamping jaws. By means of the latching mechanism, a setting of the angle

position of the camera and therefore of the joint can be latched. In this way, it is possible to use the embodiment of the arrangement shown in FIG. 1 also for a monocular with an inclined view. However, the angle element 37 is used with a longer or correspondingly long configured slide region.

The system shown in FIG. 2 includes a camera and a monocular and differs from the system shown in FIG. 1 only in that this monocular 3 has an inclined eye piece which is here at 45°C. The rotationally-movable element 54 is configured angled for adapting the arrangement 1 to this angled eye piece.

In the following, only the differences of the embodiment shown in FIG. 2 compared to FIG. 1 are discussed. Furthermore, in this embodiment, an additional stop element 61 is provided so that, when loosening the clamp element 59 before pivoting the camera 25, the camera can be moved away from the ocular 7 of the monocular 3 in the direction of the optical axis 11 of the ocular 7 before the pivot movement is carried out. For setting the original position, the counter element 57 of the length adjustment 55 is again pushed up to the stop 61 and is fixed by means of the clamp element 59. It can also be provided to make possible pulling out of the camera 25 away from the ocular of the monocular 3 by a predetermined maximum distance against a spring force. The base position is again assumed with the relaxing of the force acting from the outside. This mechanism facilitates the pivoting away from the ocular and makes possible to minimize the distance between the last lens surface of the ocular 7 and the objective of the camera 29.

In order to minimize the incidence of light between the objective and the camera, the user can use an eye shield or eye cup provided the ocular 7 is so equipped. The user can also

simply use a hand to shield the connecting location between the camera objective 29 and the ocular 7 of the monocular.

If the camera 25 is positioned with respect to the monocular, then the camera focuses automatically on the image, which is generated by the monocular, insofar as a focusing is carried out via the objective. Only in rare cases is a manual refocusing needed. If no autofocus camera is used, then the focusing has to be done manually. This arrangement of the invention is suitable to an equal extent for film cameras, digital cameras and video cameras.

By selecting the magnification to which the camera is adjusted, the image section, which is imaged by the camera, can be changed. In this way, the image section, which can be recorded by the camera, can be adapted to the image section imaged by the monocular.

In digital or video cameras, this adaptation can also be made by readjusting the recorded images. The edges, which disturb the image impression, can be removed.

List of Reference Numerals:

1 Arrangement/Mount arrangement
3 Glass (monocular or binocular)
5 Monocular
7 Ocular
9 Eye piece
11 Optical axis of the ocular
13 Objective of the glass
14 Optical axis of the objective
15 Housing
17 Focus drive
19 Attachment element
21 Grasping region
23 Grasping recesses
25 Camera
26 Camera housing
27 Digital camera
29 Camera objective
31 Camera mount
32 Base plate
33 Winding bore
35 Clamp screw
37 Angle element
39 Base
41 Base plate
43 Attachment device
45 Clamp screw
47 New attachment element
49 Joint
51 Rotational joint
53 Rotational axis
54 Rotationally-movable element
55 Length setting
57 Counter element of the length setting
59 Clamp element
61 Stop element
63 Angle element
65 Elevation setting
67 Slide
69 Clamp element
71 Angle
73 Horizontal distance
75 Vertical distance
77 Lateral setting

Claims:

1. Arrangement with a camera mount for holding a camera rearward of an ocular of a glass in the form of a monocular or a binocular, characterized in that the arrangement (1) has a base element (39) having an attachment device (43) for attaching to an attachment element of the glass.

2. Arrangement of claim 1, characterized in that a new attachment element (47) is formed in the base element (39).

3. Arrangement of claim 2, characterized in that the new attachment element (47) is arranged so as to be shifted in the direction of the ocular (7) with reference to the base element (39) formed on the glass (3).

4. Arrangement of claim 2 or 3, characterized in that several new attachment elements (47) are provided or an attachment element having variable position is provided so that always one of the new attachment elements (47) is disposed in the region of the center of gravity of the system comprising camera and glass.

5. Arrangement having a base (39) and a camera mount (31) for holding a camera (25) in an arrangement rearward of an ocular (7) of a glass (3), characterized in that the base element (39) can be mounted by means of an attachment device so as to fixed as to position relative to the glass and that a joint is arranged between camera mount (31) and base element (39) so that the camera (25) can pivoted away from the ocular (7) of the glass.

6. Arrangement of claim 1, characterized in that the camera is connected to the base element (39) via a rotational joint.

7. Arrangement of claim 5 or 6, characterized in that the joint is a rotational joint.

8. Arrangement of claim 7, characterized in that the rotational joint (51) has at least one, preferably several detent positions.

9. Arrangement of claim 7, characterized in that the rotational axis (53) of the rotational joint (51) defines an angle with the optical axis of the ocular (11) of the glass (3).

10. Arrangement of at least one of the claims 7 to 9, characterized in that rotational joint (51) is arranged between the vertical from the end surface of the ocular (7) and the new base attachment element (47).

11. Arrangement of at least one of the above claims, characterized in that a length adjusting device (55) is provided for changing the horizontal distance (73) between the camera mount (31) and the attachment device (43).

12. Arrangement of at least one of the above claims, characterized in that an elevation adjusting device (65) is provided for varying the vertical distance (75) between the base element (39) and the camera mount (31).

13. Arrangement of at least one of the above claims, characterized in that a lateral adjusting device (77) is provided

for positioning the objective (29) of the camera relative to the ocular (7) of the glass.

14. Arrangement of one of the above claims, characterized in that the camera mount (31) includes a latchable joint connection, especially a ball joint connection for facilitating a parallel alignment of the objective (29) of the camera and the ocular (7) of the glass.

15. Monocular glass having an arrangement of at least one of the above claims.

16. Arrangement for holding a camera rearward of an ocular of a glass in the form of a monocular or a binocular, characterized in that the camera can be pivoted about a point lying approximately on the optical axis.

17. Arrangement having a base element for holding a camera rearward of an ocular of a glass, characterized in that the base element 39 includes a ball joint and the camera can be pivoted away from the ocular.

Summary:

(FIG. 1)

A holding device for holding a camera rearward of an ocular of a glass such as a monocular or binocular to record an image utilizing the camera. The image is made available by the glass. This holding arrangement is usable with many cameras and binoculars or monoculars. A rapid change between the camera positioned forward of the ocular and a cleared ocular is made possible for the direct viewing by the user through the glass (binocular or monocular).

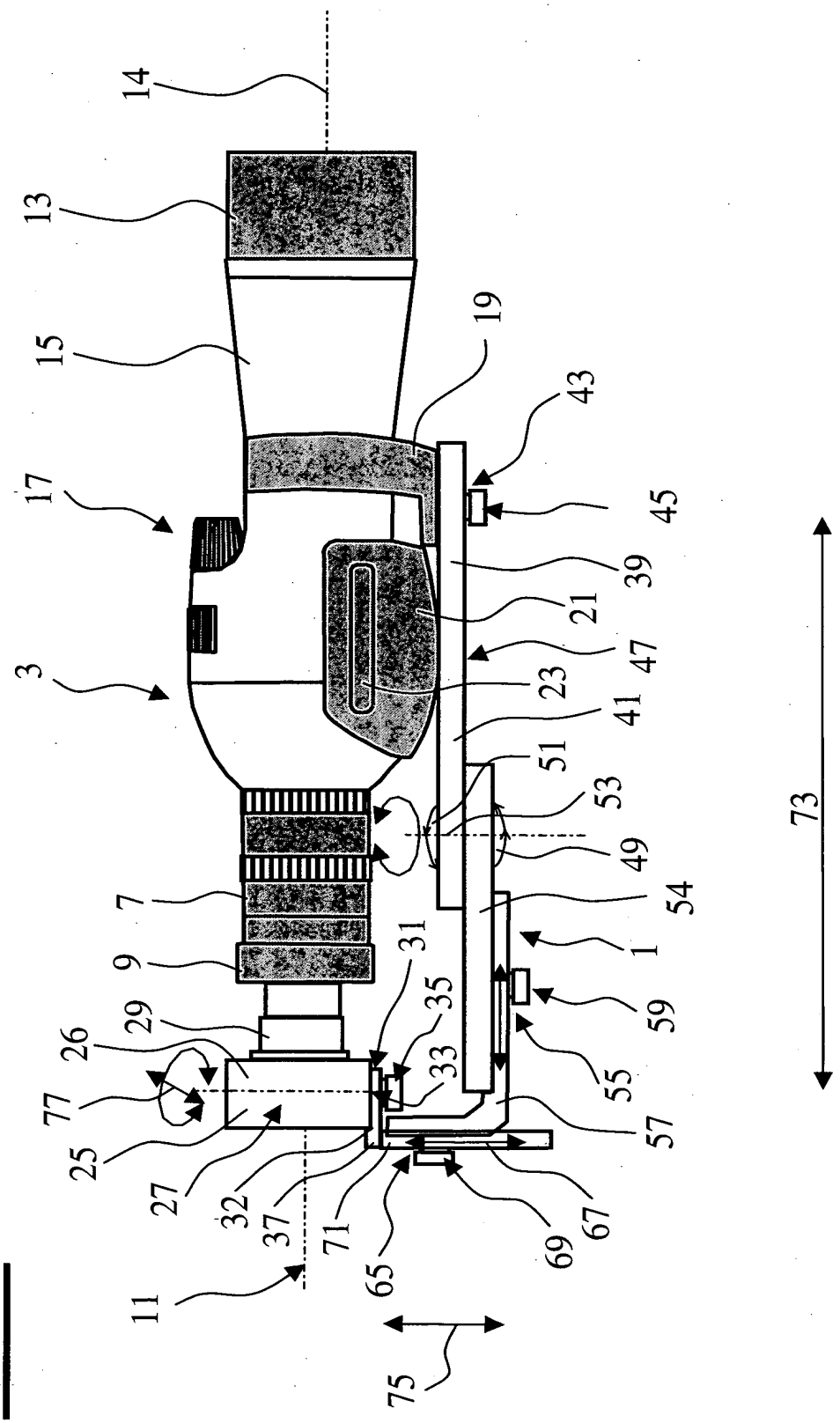
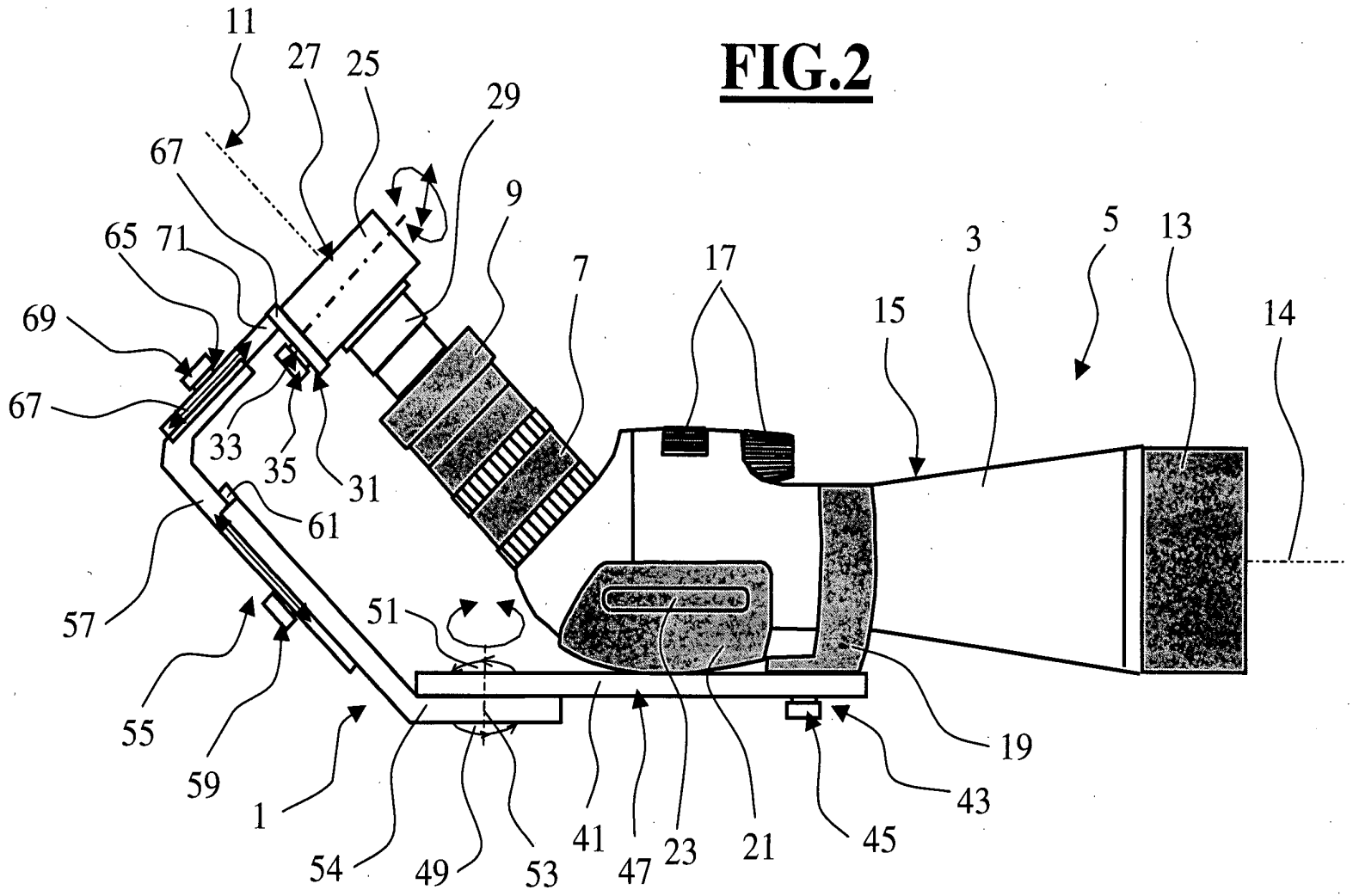


FIG.1

FIG.2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